

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A zoom lens, comprising:

four lens groups including a first lens group having a positive refractive power, a second lens group having a negative refractive power, a third lens group having a positive refractive power, and a fourth lens group having a positive refractive power, sequentially arranged from an object side, wherein when a positional state of lenses is varied from a wide-angle-end state to a telephoto-end state, the second lens group is moved to an image side, the fourth lens group is moved for compensating a variation in a position of an image plane caused by the movement of the second lens group, and the first lens group and the third lens group are fixed along the optical axis; and

an aperture stop disposed at the object side of the third lens group,

wherein the third lens group includes a negative sub-lens group having a negative refractive power, and a positive sub-lens group disposed at the image side of the negative sub-lens group with an airspace interposed therebetween, the positive sub-lens group having a positive refractive power, and

wherein the first lens group includes four lenses including cemented lenses of a negative lens and a positive lens, a positive lens, and a positive lens, sequentially arranged from the object side, and

the following conditional expression (1) is satisfied:

$$(1) 0.4 < Da/TL < 0.5$$

where Da is a distance between the aperture stop and the image plane, and TL is an overall optical length ~~(comprising the distance between a lens surface at the most closest to the object side in a lens system~~ and the position of the image plane, along the optical axis).

2. (Currently Amended) A zoom lens~~The zoom lens according to Claim 1, comprising:~~

four lens groups including a first lens group having a positive refractive power, a second lens group having a negative refractive power, a third lens group having a positive refractive power, and a fourth lens group having a positive refractive power, sequentially arranged from an object side, wherein when a positional state of lenses is varied from a wide-angle-end state to a telephoto-

end state, the second lens group is moved to an image side, the fourth lens group is moved for compensating a variation in a position of an image plane caused by the movement of the second lens group, and the first lens group and the third lens group are fixed along the optical axis; and an aperture stop disposed at the object side of the third lens group, wherein the third lens group includes a negative sub-lens group having a negative refractive power, and a positive sub-lens group disposed at the image side of the negative sub-lens group with an airspace interposed therebetween, the positive sub-lens group having a positive refractive power, and

the following conditional expression (1) is satisfied:

$$(1) \ 0.4 < Da/TL < 0.5$$

where Da is a distance between the aperture stop and the image plane, and TL is an overall optical length comprising the distance between a lens surface closest to the object side and the position of the image plane, along the optical axis, and

wherein the following conditional expression (2) is satisfied:

$$(2) \ 13 < |f_{3n}|/f_w < 18$$

where f_{3n} is a focal length of the negative sub-lens group disposed in the third lens group, and f_w is a focal length of the whole lens system in the wide-angle-end state.

3. (Cancelled).

4. (Currently Amended) The zoom lens according to ~~Claim 3~~ Claim 1 or 2,

wherein the following conditional expression (3) is satisfied:

$$(3) \ 2.5 < f_1/(f_w \cdot f_t)^{1/2} < 3.5$$

where f_1 is a focal length of the first lens group, and f_t is a focal length of the whole lens system in the telescope end state.

5. (Original) The zoom lens according to Claim 1 or 2, wherein the second lens group includes four lenses including a meniscus negative lens with a concave thereof facing the image side, a negative lens, a positive lens, and a negative lens, sequentially arranged from the object side.

6. (Original) The zoom lens according to Claim 5,
wherein the following conditional expression (4) is satisfied:

$$(4) 0.42 < |f_2|/(f_w \cdot f_t)^{1/2} < 0.5$$

where f_2 is a focal length of the second lens group.

7. (Original) The zoom lens according to Claim 1 or 2, wherein the fourth lens group includes three lenses including a positive lens, a negative lens, and a positive lens, sequentially arranged from the object side.

8. (Currently Amended) An imaging apparatus, comprising:

a zoom lens; and

an imager which converts an optical image formed by using the zoom lens into electric signals,

wherein the zoom lens includes:

four lens groups including a first lens group having a positive refractive power, a second lens group having a negative refractive power, a third lens group having a positive refractive power, and a fourth lens group having a positive refractive power, sequentially arranged from an object side, wherein when a positional state of lenses is varied from a wide-angle-end state to a telephoto-end state, the second lens group is moved to an image side, the fourth lens group is moved for compensating a variation in a position of an image plane caused by the movement of the second lens group, and the first lens group and the third lens group are fixed along the optical axis; and

an aperture stop disposed at the object side of the third lens group,

wherein the third lens group includes a negative sub-lens group having a negative refractive power, and a positive sub-lens group disposed at the image side of the negative sub-lens group with an airspace interposed therebetween, the positive sub-lens group having a positive refractive power, and

wherein the first lens group includes four lenses including cemented lenses of a negative lens and a positive lens, a positive lens, and a positive lens, sequentially arranged from the object side, and

the following conditional expression (1) is satisfied:

$$(1) 0.4 < Da/TL < 0.5$$

where Da is a distance between the aperture stop and the image plane, and TL is an overall optical length ~~(comprising the distance between a lens surface at the most~~ closest to the object side ~~in a lens system~~ and the position of the image plane, along the optical axis).

9. (Currently Amended) An ~~The~~ imaging apparatus ~~according to Claim 8, comprising:~~
a zoom lens; and
an imager which converts an optical image formed by using the zoom lens into electric signals,

wherein the zoom lens includes:

four lens groups including a first lens group having a positive refractive power, a second lens group having a negative refractive power, a third lens group having a positive refractive power, and a fourth lens group having a positive refractive power, sequentially arranged from an object side, wherein when a positional state of lenses is varied from a wide-angle-end state to a telephoto-end state, the second lens group is moved to an image side, the fourth lens group is moved for compensating a variation in a position of an image plane caused by the movement of the second lens group, and the first lens group and the third lens group are fixed along the optical axis; and

an aperture stop disposed at the object side of the third lens group,

wherein the third lens group includes a negative sub-lens group having a negative refractive power, and a positive sub-lens group disposed at the image side of the negative sub-lens group with an airspace interposed therebetween, the positive sub-lens group having a positive refractive power, and

the following conditional expression (1) is satisfied:

$$(1) 0.4 < Da/TL < 0.5$$

where D_a is a distance between the aperture stop and the image plane, and TL is an overall optical length comprising the distance between a lens surface closest to the object side and the position of the image plane, along the optical axis, and

wherein the following conditional expression (2) is satisfied:

$$(2) \ 13 < |f_{3n}|/f_w < 18$$

where f_{3n} is a focal length of the negative sub-lens group disposed in the third lens group, and f_w is a focal length of the whole lens system in the wide-angle-end state.

10. (Cancelled).

11. (Currently Amended) The imaging apparatus according to ~~Claim 10~~ Claim 8 or 9, wherein the following conditional expression (3) is satisfied:

$$(3) \ 2.5 < f_1/(f_w \cdot f_t)^{1/2} < 3.5$$

where f_1 is a focal length of the first lens group, and f_t is a focal length of the whole lens system in the telescope end state.

12. (Original) The imaging apparatus according to Claim 8 or 9, wherein the second lens group includes four lenses including a meniscus negative lens with a concave thereof facing the image side, a negative lens, a positive lens, and a negative lens, sequentially arranged from the object side.

13. (Original) The imaging apparatus according to Claim 12, wherein the following conditional expression (4) is satisfied:

$$(4) \ 0.42 < |f_2|/(f_w \cdot f_t)^{1/2} < 0.5$$

where f_2 is a focal length of the second lens group.

14. (Original) The imaging apparatus according to Claim 8 or 9, wherein the fourth lens group includes three lenses including a positive lens, a negative lens, and a positive lens, sequentially arranged from the object side.

15. (New) The zoom lens according to Claim 1, wherein the following conditional expression (2) is satisfied:

$$(2) \ 13 < |f_{3n}|/f_w < 18$$

where f_{3n} is a focal length of the negative sub-lens group disposed in the third lens group, and f_w is a focal length of the whole lens system in the wide-angle-end state.

16. (New) The imaging apparatus according to Claim 8, wherein the following conditional expression (2) is satisfied:

$$(2) \ 13 < |f_{3n}|/f_w < 18$$

where f_{3n} is a focal length of the negative sub-lens group disposed in the third lens group, and f_w is a focal length of the whole lens system in the wide-angle-end state.